

### New techniques for tomorrow's TEM material research

Going from viewing samples to performing your experiments inside the TEM in real time

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In the field of nanotechnology, imaging and characterisation of miniaturised devices are important. Nowadays there are many different tools for material characterisation and imaging. Transmission Electron Microscopy (TEM) is one of them with sufficiently high resolution imaging which is used for structural characterisation of almost any type of material. However, the ability to manipulate the sample and study its properties while simultaneously observing it in the TEM is limited. To be able to fully characterise the specimen, it is not enough to just visualise them, but also to study real time interplay between properties/ structures at atomic scales i.e. to be able to perform *in situ* TEM/physical measurements.

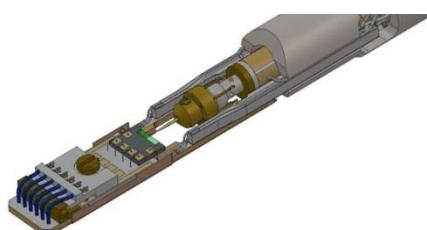
Nanofactory Instruments develops, manufactures and provides advanced instruments for *in situ* TEM/physical characterisation of materials. These instruments are powerful in a way that they can directly correlate the atomic-scale microstructure of material with its physical properties, providing a dynamic correspondence in structure-property characterisation. With five models to choose from Nanofactory instruments can offer an unique solution in the area of **Electrical, Microforce, Nanoforce, Optical and Cathode-Luminescence** probing. These instruments combine advanced technology by creating a compact design nanomanipulator with precise movement in nm range along with an mm range coarse movements. The key benefits of TEM *in situ* probing techniques lie in the abilities to:

- Locate and align a probe to nanoscale objects with high precision
- Characterise both object and probe by high resolution imaging using TEM
- Carry out electrical, mechanical and optical probing *in situ*
- Study dynamical processes

This combined approach offers outstanding nanotechnology tools for manipulation, measurement and imaging on the atomic scale and new opportunities for research and development in areas such as materials science, nanotechnology and semiconductor technology. With these unique tools, scientists can retrieve previously inaccessible data about physical properties of individual nanostructures.



**Figure 1:** Schematic of a Nanofactory Instrument holder



**Figure 2:** Schematic of the front end of a MEMS specimen mounted on a carrier.

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